Proceedings of the North Coast Eulachon Workshop: March 4-5, 2009, Prince Rupert, British Columbia

C.C. Murray and T.W. Therriau't

Fisheries and Oceans Canada
Science Branch, Pacific Region
Pacific Biological Station
Nanaimo, British Columbia
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PROCEEDINGS OF THE NORTH COAST EULACHON WORKSHOP: MARCH 4-5, 2009, PRINCE RUPERT, BRITISH COLUMBIA

by

C.C. Murray and T.W. Therriault

Fisheries and Oceans Canada
Science Branch, Pacific Region
Pacific Biological Station
Nanaimo, British Columbia
V9T 6N7

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ABSTRACT

Murray, C.C., and Therriault, T.W. 2010. Proceedings of the North Coast Eulachon Workshop: March 4-5, 2009, Prince Rupert, British Columbia. Can. Manuscr. Rep. Fish. Aquat. Sci. 2936: v + 19 p.

Eulachon (*Thaleichthys pacificus*) is a small fish species traditionally distributed from California to Alaska. The rapid coastwide decline of eulachon stocks in the early 1990s has prompted a series of regional meetings to discuss research, traditional knowledge, impacts, and recovery. The North Coast Eulachon Workshop was held March 4-5, 2009 in Prince Rupert, British Columbia, Canada. The workshop hosted experts from a range of backgrounds and perspectives, including Fisheries & Oceans Canada (DFO) fisheries scientists, First Nations representatives, fishermen, and academics. The proceedings detail the presentations and resultant discussions. The workshop reviewed the status of eulachon stocks by river system, which all show little signs of recovery, with the exception of the Nass River. An eloquent oral history of eulachon significance and the effects of its decline was presented by representatives of the Haisla, demonstrating the extremely high cultural importance of this species. The workshop also sought opinions regarding important threats to eulachon population recovery. Threats highlighted include fisheries bycatch, habitat changes and climate change. The implications of a COSEWIC listing for eulachon were reviewed and discussed. Finally, a suite of research needs were identified that included both river and ocean-based research to support a better understanding of this species and assist recovery efforts.

RÉSUMÉ

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L'eulakane (*Thaleichthys pacificus*) est une espèce de poisson de petite taille traditionnellement répartie de la Californie à l'Alaska. Au début des années 1990, le déclin rapide des stocks d'eulakane sur l'ensemble de la côte a déclenché une série de rencontres régionales visant à discuter de la recherche, des connaissances traditionnelles, de l'impact de ce déclin et du rétablissement de l'espèce. Un atelier sur l'eulakane du nord de la côte de Colombie-Britannique (North Coast Eulachon Workshop) s'est tenu les 4 et 5 mars 2009 à Prince Rupert, en Colombie-Britannique. Cet atelier accueillait des experts de divers domaines et de diverses visées, notamment des scientifiques de Pêches et Océans Canada (MPO), des représentants des Premières Nations, des pêcheurs et des universitaires. Le compte rendu résume en détail les présentations ainsi que les discussions qui en ont découlé. L'atelier a permis de passer en revue l'état des stocks d'eulakane dans différents réseaux fluviaux qui montraient tous peu de signes de rétablissement, à l'exception du réseau de la rivière Nass. Des représentants de la Première Nation Haisla ont donné un aperçu historique éloquent de l'importance de l'eulakane et des effets du déclin de l'espèce, montrant son extrême valeur sur le plan culturel. L'atelier a également permis d'entendre différents points de vue sur les menaces considérables susceptibles de nuire au rétablissement de l'espèce, notamment sur les prises accessoires, la modification de l'habitat et les changements climatiques. Les incidences d'une désignation de l'espèce par le Comité sur la situation des espèces en péril au Canada (COSEPAC) ont été examinées. Enfin, des besoins en recherche ont été ciblés. Entre autres, des recherches à l'échelle des cours d'eau et de l'océan permettraient de mieux comprendre l'espèce et de favoriser son rétablissement.

INTRODUCTION

Eulachon (*Thaleichthys pacificus*) is a small fish species in the family Osmeridae. They are usually less than 25cm in length and 40-60 g in weight. Eulachon are limited to the northeast Pacific Ocean and are distributed from northern California to the southern Bering Sea. Eulachon spend most of their life cycle in the marine environment but are anadromous, spawning in the lower reaches of coastal freshwater rivers. There are about 30-40 eulachon rivers within their range (DFO 1999). Eulachon spawning rivers have significant spring runoffs, called freshets, and usually drain glaciers (DFO 1999). Mature adults lay small (<1mm diameter), adhesive eggs in coarse sand or gravel habitats and the eggs incubate for two to five weeks, depending on ambient temperature (DeLacy & Batts 1963; Hay & McCarter 2000). After hatching the small larvae (6-8 mm long) are advected downstream to marine waters. Depending on where in the river eulachon choose to spawn, some fertilized eggs also are advected downstream. Little is known about the life cycle following advection into estuaries but larvae may rear in estuarine waters and juveniles may utilize progressively deeper marine waters as they mature (Hay & McCarter 2000). Adult eulachon live in marine waters for two to five years before returning to freshwater but most spawning fish are believed to be age-3 (DFO 1999). In British Columbia, adult eulachon are found on the offshore shelf at 80-200m depth in Hecate Strait, Dixon Entrance, Queen Charlotte Sound, and off the west coast of Vancouver Island (DFO 2005). Similar to other anadromous species, eulachon probably spend some time holding in brackish water in order to prepare for their freshwater spawning run. Large post-spawning mortalities are well known and eulachon are now believed to be completely semelparous, reproducing once and then dieing (Hay & McCarter 2000).

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Biology of Eulachon and Status of Southern Stocks

Tom Therriault, Fisheries & Oceans Canada

The Fraser River is the southernmost eulachon stock in Canadian waters. Each year stock biomass is estimated based on an egg/larval survey initiated in 1995, after the coastwide collapse of eulachon. Although there was a very small increase in estimated spawning stock biomass in 2007 (based on the egg/larval survey) actual Spawning Stock Biomass (SSB) remained significantly lower than established action levels (DFO 2007). Further, returns in 2008 and 2009 remained dismal. There has been no evidence of recovery in the Fraser River stock and the stock continues to remain at precarious levels. A second index of abundance is the offshore index created from research trawl surveys that extends back to the early 1970s. There was a peak in this index in the early 2000s and then slight evidence of increasing offshore biomass. However, there seems to be no relationship between the offshore index and the in-river returns. An eulachon test fishery was conducted on the Fraser River between 1995 and 2005. The overall trend from the test fishery data was downwards when it ended in 2005. The managers for the Columbia River reported a slightly lower return this year (2009) compared to previous years, approximately 6-8 tonnes. Washington State employs a staged management plan which includes gradual reduction in fishing effort, rather than a complete shutdown.

One of the perplexing issues is the genetic structure of offshore fish. The summer feeding grounds off the west coast of Vancouver Island appear to be a mix of Fraser, Columbia and other stocks. Recently, a research project was initiated to discriminate offshore stock structure using genetic markers. However not all BC rivers have been sampled, thus, there remains a need for samples from these rivers to complete the baseline database for genetic analyses. Previous analyses of microsatellite genetic data suggest that there are at least nine distinct units in BC (Beacham et al. 2005). These units can represent a single river but often they represent an aggregate of a few rivers within a common estuary or inlet. Preliminary genetic analyses (unpublished data) of research trawl data offshore on the west coast of Vancouver Island show approximately 80% of fish are Columbia River origin while 20% are Fraser River origin. However, in samples obtained in waters north of Nootka Sound, the proportions change to reflect more Fraser River and potentially central coast rivers. However, due to incomplete baseline data, several genetic signatures currently cannot be assigned to specific river systems.

Research trawl data presented here is opportunistically gathered during the course of other research projects. Data includes weight of species caught only. In recent years there has been effort made to include size of individual eulachon. Some of the west coast Vancouver Island and Chatham Sound data have size included but only from 2003 onwards.

There are many unknowns about the biology and ecology of eulachon; including migration routes, interception places, habitat requirements, spawning grounds, collection areas, effects of habitat loss and alteration, etc. There is very little money to conduct new research and most of the current projects conducted both by DFO and FN are smaller-scale and resource limited.

Biological Overview of Eulachon

Doug Hay, Fisheries & Oceans Canada (Retired)
The north Pacific is the centre of endemism for smelts. Their range corresponds to the north temperate rainforest. Eulachon are not found on coastal islands and they tend to spawn in rivers with glacial freshets. In BC, approximately 35 rivers host eulachon spawning and approximately the same number of spawning rivers exist in Alaska. A subset of these rivers supports regular runs and these tend to be inshore. Offshore, eulachon occupy the 50-100m depth range. Data from the spawning stock biomass (SSB) and bycatch offshore index indicate that most eulachon spawn at age three but some spawn at age four. Offshore growth rate is very fast but there is variation in growth rate between years.

Beginning in 1994, eulachon declines occurred but were not documented, especially in the central and north coast rivers where eulachon are harvested by First Nations for grease. In 1995, commercial fishermen brought the eulachon decline in the Fraser River to the attention of DFO. The current Fraser River egg and larval survey began in response to these concerns. Subsequently, an examination of eulachon trends for the

largest stock, the Columbia River, also showed a significant decline. Collectively, this data suggest eulachon declines in the mid-1990s were a coast-wide phenomenon. In 2008, the main eulachon rivers all appeared to be reduced. However, not all rivers have definitive and continuous spawning activity. Offshore, the eulachon index generated from trawl surveys is higher than in–river estimates from the Fraser River, highlighting a potential disconnection between offshore stock size and in-river returns. For example, in one year the offshore index was 1000 tonnes while the Fraser River SSB was estimated at only 10 tonnes. The cause of this phenomenon could be attributed to one or more of the following theories. First, eulachon are not spawning as far up the river as in previous years. This could be a result of changes in spawning size so that smaller fish spawn in lower regions. Second, change in timing of larval release to coincide with spring bloom in marine waters. Third, the mixture of stocks offshore is complicated in space and time and thus difficult to correlate to any specific river. Additional research would be required to test these theories.

Between 2003 and 2004 there was a big decline observed in the rivers that corresponded to a decline in offshore index. Most of the rivers south of Alaska have declined and some runs could be considered extirpated. The US has looked at listing the Columbia River eulachon stock as endangered. The report has been submitted but not yet been released to the public. Subsequent to the workshop in March 2009, the Columbia River eulachon stock was listed.

Historical Eulachon Records

Victor Ewert, Consultant
Historical trade reports can shed light on eulachon abundance. Hudson's Bay Company records from 1835-1865 indicate periods of low eulachon abundance. There is similar anecdotal evidence for the Columbia River during that same timeframe. A Dominion of Canada report dated 1881 reported that thousands of people came to the Nass River in response to the eulachon run. Reports exist showing good and bad years, demonstrating that eulachon exhibit natural fluctuations between plenty and scarcity. A concerted effort to dissect historical accounts could lead to a better understanding of eulachon abundance fluctuations.

STATUS OF EULACHON RUNS IN BRITISH COLUMBIA

The following section summarizes eulachon information for each spawning system in British Columbia. Though not employed during the meeting, it was suggested that a standardized scale of run size be adopted. This would allow the creation of an eulachon 'report card' which could be reviewed and updated annually. The report card would give managers, researchers, and interested parties a quick overview of eulachon run size relative to past runs for each spawning river across the entire range. A scale developed by Moody (2008) used the following: 0 = Absent, 1-2 = Very low, 3-4 = Low, 5 =

Average, 6-8 = High, 9-10 = Very high. Assignment of status could be based on research data, traditional knowledge, observation or some combination of all three.

Nass River

Blair Stewart, Nisga'a

The eulachon run in the Nass is considered the last "healthy" eulachon run and all current efforts are made to protect this run. Recent efforts have focused on collecting harvest data. On average, 200-300 tonnes per season are harvested through 5-6 Nisga'a camps and a single Tsimshian camp. Those areas designated spawning grounds have been protected. An incorporated "Fishery Bay" is designated as an eulachon harvest ground which allows only traditional fishing methods. Over the last few years, areas outside have been closed to shrimp trawl because of the lack of observer coverage. Catch numbers fluctuate between years and there is evidence of strong and weak years. In ice years, harvest is difficult and the catch data reflects low effort rather than abundance. In 2005, for the first time there were reports of smaller and darker fish which was repeated in again in 2006. Current monitoring includes a three week sampling period where length, weight, sex ratio and other data are collected. Also, bird and mammal assessments have been conducted to watch for activity trends but no analyses have been conducted due to a lack of funding. Currently, the run seems to be holding strong but when research data is combined with elder's knowledge, these trends have been seen before. One concern was raised over a potential SARA listing for eulachon and how units are designated. Specifically, combining river systems into a single designatable unit (DU) rather than looking at individual rivers could result in denied fishing opportunities in healthy rivers should the species be listed under SARA.

Skeena River

Don Roberts, Kitsumkalum

There are five eulachon runs in the Skeena River. In the late 1990s, eulachon research began in the Skeena River and two of its tributaries. The impetus was three consecutive years of low eulachon runs. There is concern about commercial fishing practices in Hecate Strait as this is a likely migration route for Skeena eulachon. There is anecdotal information about eulachon interception in this area but no hard data. Browning Entrance is known as an eulachon holding area around November; a single shrimp trawler pulled up over 100 tonnes one year in this location. It is likely that eulachon hold here until their eggs are ripe and then continue up the river to spawn. At the beginning of February sea bird activity is an advance warning that eulachon are near. There is an urgent need for studies on the timing and location of eulachon throughout the year, not simply spawning locations. Port Essington is where eulachon harvest begins. Then harvest will continue in Ecstall or Skeena depending on timing. The spawning activity in the two tributaries is slightly earlier than in the Skeena. Khyex River, one of the test sites, has a small run and eulachon are known to move approximately five miles up from the fork. In Ecstall, females are smaller than in other tributaries while the males show no differences.

It is possible that the rough, high water causes eulachon to work harder and they have less grease content. Elder knowledge indicates that the run used to make it further up the river.

In the sampling area, incubation time ranges from 50-60 days. Eggs are present in the Skeena in March and April. Physical conditions required for spawning include, but are not necessarily limited to, sediment size, salinity, depth, and temperature. Spawning adults prefer coarse sediment and will not spawn in muddy areas. Salinity is important as the presence of salt will cause eggs to turn white and die. Spawning occurs in the 20-24 feet depth range. The inception of the eulachon run occurs when air temperature reaches 6-7 degrees. Traditional knowledge documents that the run always coincides with the appearance of salmon berry buds.

Research methodology includes two-man portable gear pulled along the bottom. In Kitsumkalum, anchors are used to set the nets which allow fishing even during periods of ice as the balloons fit under the ice. The plankton tow apparatus also records temperature, water flow, and salinity. Plankton tows are performed three at a time, every two hours on a falling tide. Gillnet sampling also is performed and egg beds are identified using plankton tows. The group is working with a private consultant, CambriaGordon, to identify spawning beds. Eulachon spawning areas are ranked 1-6, with 1 being the highest (most preferred or productive). Zigzag grapples are performed to search for eggs. When eggs are located, plankton tows are used to confirm larvae in the water once hatching begins. Grappling sites are the same each year and use identical gear. There are salinity test areas in Snow Bound Creek and Dehorsey. At a gill net test site, the first 100 fish caught are examined to look at sex ratio, length, and weight. During the course of this work the appearance of an unknown parasite on the gills of a number of eulachon has been documented.

Sea gull and sea lion activity is a reliable indicator of the size of the run. If more than four sea lions are observed near the net, then there would be lots of eulachon caught. A good run will support 40-100 sea lions. In 2008, there was only one sea lion spotted and the run was very small, only 66 fish in total. It seemed that males came in first last year and the females did not return at all. This year (2009) there is an indication of a medium-size run, an improvement over the previous year.

Funding is a continuing problem to carry on and enhance the work already underway. Future research needs in this system include: 1) stomach content analysis to see how eulachon fry are part of the foodweb; and 2) better characterization of the anecdotal links between eulachon abundance and sea lions, sea gulls, and diving ducks.

Wuikinuxv (formerly Oweekeno)

Research is just beginning on the Wannock River and three other systems that drain into Moses Inlet. Eulachon have been mostly absent since the mid 1990s. There have only

been small returns since then and they have not been seen at all in Drain Inlet since 2007. Efforts are being made to revive this program.

Kingcome Inlet

Representatives were not present at the meeting.

Knight's Inlet

E-mail communication with representatives indicated that 2008 was not a good year in terms of run size but 2007 was higher.

Bella Coola

Megan Moody, Nuxalk
As part of a master's degree at UBC (Moody 2008), a review of historical eulachon fishing was performed, using both quantitative and qualitative information. In total, eight different data sources were analyzed. To estimate catch and relative abundance trends, a reconstruction of grease production from 1980-1998 was performed for the Bella Coola River. The last large eulachon run in Bella Coola was 1996 and there has been no fishery in this area since 1998. The 2001-2007 results estimated very low runs. The school sizes have been so reduced that researchers need to sample to locate the runs as they are no longer visible from the surface. An annual run before the decline was approximately 150 tonnes while the 2008 run was estimated to be less than 150kg. Changes in the timing of the run have been observed, becoming earlier each year. Analysis of the length and weight data shows that these parameters also are decreasing. There are not enough fish for formal statistical analyses but the trend is evident.

Moody's Master's research developed an abundance index for each year and each system. Methods included a fuzzy logic technique that incorporates both traditional knowledge and quantitative data. As a result of this analysis, most of the south and central BC rivers have a declining trend but not all have crashed. The Fraser River has the longest time series and has evidence of decline since the late 1940s. The Columbia River shows a slow decline. The index gets worse as you move south; for some reason, the northern rivers seem to be doing better.

Also, as part of her thesis, Moody reviewed possible impacts on eulachon populations. Several potential hypotheses were explored using both scientific and First Nations' knowledge and input. For the Nuxalk people in Bella Coola, the number one concern was eulachon bycatch in the shrimp trawl fishery. Other suggested hypotheses for eulachon collapse included river habitat modification like dams and dikes or direct overfishing for eulachon. The list of hypothesized impacts included land and water use issues, fisheries (both directed and bycatch), climate change impacts on freshwater

habitat, climate change impacts on marine habitat (food availability and warm water predators), and increase in predation (seals and sea lions). To test these hypotheses, a correlation analysis was conducted using abundance indices and five impact factors. There was no significant correlation with shrimp catch in Queen Charlotte Sound for the same year but the relationship became significant with a one year time lag. The results showed that shrimp bycatch may be significant with a one, two or three year time lag. Both the Fraser River eulachon biomass estimates and Columbia River commercial eulachon catches have high correlations with the Bella Coola biomass estimates. There were significant negative correlations with hake catch, and with seal and sea lion abundance, suggesting predation may be an important factor. However, there also was a positive correlation found between hake abundance and 4 of the 7 eulachon river abundance indices tested. Therefore it is possible that for some systems the same factors responsible for increasing hake abundance simultaneously increase eulachon abundance. Further, there were weak correlations in a few systems between eulachon abundance and climate indices. Summer sea surface temperature also seems to have some impact on eulachon in a few of the rivers (with information available) studied.

Plankton tow research is now conducted in adjacent systems to the Bella Coola River to see if the eulachon have moved elsewhere. In Paisla Creek, Necleetsconay and South Bentinck Arm there is little evidence of large numbers, dismissing the suggestion of migration elsewhere. In 2008, changes were made to the sampling sites to look at the lower reaches of the river. Test sites were selected to span the length of the river all the way to the mouth. There were more eggs and larvae found in the lower reach of the river which could suggest a shift to lower spawning sites. Tows performed in the estuary showed that larvae are present here for approximately seven weeks, from March through mid-May.

An incubation study also is ongoing in Bella Coola. To start, the adult broodstock are captured live and placed in chum salmon egg incubation cells. By holding the eulachon they are attempting to see if the conditions for spawning, hatching, fertilization, and/or survival of larvae can be understood and improved. Only about 10 females per year are used because of the amount of work involved with incubation. Results show that eulachon in this system hatch quickly and timing is very dependent on water temperature.

Recommendations for future studies include continuation of research to provide a time series of abundance data for the Bella Coola River. A complete comparison of old and new sites should be conducted. It is critical to find out what is occurring in the Central Coast. There is a need for a biomass estimate for the tributaries, such as Paisla Creek. Again, resources are limited and the funding through AFS does not cover all project costs.

POTENTIAL THREATS TO EULACHON

The decline in eulachon populations has not been successfully attributed to a single cause. There are likely multiple causes that have led to decline and subsequent lack of recovery. The major threats identified and discussed during the workshop include offshore bycatch, habitat changes and climate change, each of which is discussed below.

Trawl Bycatch

There is anecdotal evidence that locals can buy eulachon from shrimp trawl boats but it is not documented. There is a need to examine bycatch records of eulachon in various fisheries, primarily trawl fleets, from periods before the coastwide decline of eulachon. Special attention should be paid to examine the possibility of misreporting and misidentification of eulachon (e.g., sometimes just marked as 'smelt'). The scientific reports by DFO on eulachon bycatch in the shrimp trawl industry during the late 1990s indicate high catches of eulachon in the offshore areas of the Central Coast. This type of analysis would further highlight areas with historically high bycatch that could be closed to trawl fishing (e.g., Queen Charlotte Sound in 2000). Central Coast First Nations want to see all Inlet areas in the Central Coast (8IN, 9IN, 7IN) closed to shrimp fishing until the Central Coast eulachon stocks recover (M. Moody, personal communication). It has been shown that different shrimp fishing gear catch eulachon in different ways. For example, beam trawls with low-rise nets may avoid eulachon bycatch completely. Also, it has been suggested that eulachon bycatch can be reduced by using excluder devices in nets and taking proactive management actions (e.g., area closures) to limit potential interactions with eulachon. Mandatory use of bycatch reduction devices in BC have been in place since 2000 but their effectiveness at reducing eulachon bycatch must be thoroughly tested. Research also should examine collateral damage – the possible mortality due to encounters with nets, not just those fish landed. Smaller fish such as herring and eulachon may suffer from exhaustion and/or scale and skin damage resulting in their mortality regardless of actual capture. Sensitive areas should be protected for the entire spawning and incubation period. Trawl boats at the mouth of the estuary could be affecting eulachon habitat and could pose a threat to adults passing through to spawn or juveniles on their way out to sea. Observer coverage is very low in this industry and it is badly needed to protect both eulachon and the industry. At the time of this workshop there were 13 active shrimp trawl licenses in the Prince Rupert area but many more that are currently inactive due to low demand and low prices for shrimp (a situation that could change at any time).

Habitat Changes

Habitat changes in eulachon rivers may have contributed to eulachon declines and could be hindering their recovery. Sediment type is important for spawning grounds and therefore the habitat is vulnerable to dredging activities. Salinity also seems to be an important factor and water quality changes could potentially affect spawning success. In

some places habitat quality actually may have improved in recent years. For example, in the Fraser River, dredging used to occur during eulachon spawning but this has stopped. Anecdotally, Kitimat still has possible habitat issues, including pulp mill operations and a fish hatchery. However, previous issues related to sewage appear to have improved in recent years. In Kemano, there may be altered river outflow. In Bella Coola, habitat changes are not likely the reason for declines (as there haven't been any) and thus the cause likely lies elsewhere.

Climate Change

There are multiple impacts associated with climate change that could affect eulachon. For example, changes in the timing or volume of spring freshets could potentially affect eulachon runs. Changes in distribution of eulachon predators as a result of changing climate conditions also would affect eulachon populations. For example, hake and Humbolt squid have expanded their ranges in recent years in response to changing marine conditions. Though, gut analyses have shown that hake do not consume a lot of eulachon it might not take a large amount of predation to negatively affect already depressed populations.

IMPLICATIONS OF COSEWIC

Doug Hay, Fisheries & Oceans Canada

The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) has a number of subcommittees and one is dedicated to marine fish. In response to a request for a report on eulachon, a COSEWIC review was undertaken by Doug Hay and Megan Moody. A draft was expected by the end of March (2009) that would then go to the scientific subcommittee for review. It is likely the genetics, in particular, will be scrutinized as this could be the determining factor whether all BC eulachon are considered one stock (population) or several. Hay and McCarter (2000) published a review of eulachon status without genetic data. This first draft of a COSEWIC-type paper indicated that each river was independent and that some stocks were more depleted than others. Also, the BC Provincial government has their red/blue listing system where species at the brink of extinction fall under special rules. Eulachon is currently a blue-listed species: a species of special concern (BC Conservation Data Centre 2010). At this point, it is uncertain how the COSEWIC subcommittee will interpret the eulachon data due to a number of uncertainties. For example, there seems to be an abundance of eulachon offshore but they're not returning to the rivers. The question of stock units is crucial; COSEWIC could choose to consider each river or stock unit independently and thus assign individual listings. If the subcommittee recommends the most extreme listing – endangered, directed fisheries by First Nations could be severely restricted. In this way, an endangered listing could be more of a problem than a solution for some First Nations in BC where runs continue to hold steady. If listed, a recovery team would identify recovery targets and may recommend more research on eulachon, including the role of eulachon in ecosystem function, especially where relationships exist with

commercially important species that are dependent upon eulachon. This in turn may raise the species' profile and secure additional funding.

FIRST NATIONS AND EULACHON

A Personal View of Eulachon Sorrows

Norman Dale, Consultant
The loss of eulachon has had wide-reaching effects. First, eulachon is a treasured foodstuff and emblematic of a way of life. Researchers like James Wortman are confirming what the First Nations already knew, that eulachon contains chemicals that promote health. Second, loss of eulachon means lost income as eulachon was used both as cash and barter. Third, with the loss of eulachon First Nations peoples have lost the connection between communities and generations. Finally, with the decline in eulachon there is the loss of a keystone species. Although relationships between eulachon and other species are not fully understood, it is expected that impacts on the ecosystem (including trickle down effects on other species) due to the loss of eulachon will occur.

Since the Central Coast collapse there has been a number of important meetings. In 2000, a "crisis council" was convened. A resolution was passed there to call for a moratorium on shrimp fishing in known eulachon habitat. In 2007, a Bella Coola gathering was well attended by the Central Coast First Nations but only a handful could come from the north. The recommendations from the central coast meeting included

- biological research to determine the reasons for the collapse
- document the social and cultural impact of the decline
- publicize and politicize the crisis in order to raise the profile of this issue
- address the legal dimensions
- assess reintroduction and enhancement possibilities
- collaboration among BC Nations, or the so-called "Eulachon Nations"

The collaboration did not materialize from the Bella Colla meeting but is still gravely needed. Norman put forth the idea of an Ooligan Conservation Society to support the First Nations collaboration.

Oral History of Eulachon

The following section aims to capture the moving speeches given by representatives of the Haisla. Personal accounts and oral histories are often not included in proceedings but the organizers felt these presentations were important to the spirit and content of the meeting. This section is not presented as a summary but a close account of the actual narrative and therefore written in first person.

Ken Hall

I have come to express concerns from the whole community. Why are we not doing anything about it? Many times we have tried to voice our concern regarding the eulachon. In Douglas Channel, way back when, that river was resourceful; many species, not just the eulachon. There was a great abundance when I was small; so much eulachon that some people said you could walk on them. In some years, this was less. Some members said it was when the industries came around we felt the effect of it. And right away we found out that they were discharging into the river. Then the pulp mill came. People started complaining after noticing the difference in taste. The Chief and Council at that time called a meeting and said don't worry about the taste; there's nothing wrong with it. But we noticed that people were dying of stomach cancer. We left the area as we couldn't use that eulachon. We have five rivers. We have seen the Kildala die off. We moved to Kemano, which is costly for our people and there instead of each family having a camp, we combined into a company. Some could not make the journey. Kitlope was another tributary we fished. Another river was there but we never verified if there were any eulachon. As far as we know all rivers are dead for eulachon. Something my elders have voiced in the past. There is something up there in that river keeping the eulachon away. We tried to tell the government but no one knew anything about it. This is our sixth year without eulachon. The last two years we were up in Kemano. Eulachon made it as far as the estuary but did not come up into the river. We are hollering for help. Find out why the fish we are totally dependent upon is no longer there anymore. This area used to be nothing but kelp. There is no longer any kelp patch. Kitamaat village had a kelp patch right in front that is no longer here. We hear news of global warming and I say our ocean is dying; and with it any future for our children yet to be born. We need to work together and help each other to get the things back we depended upon when we were an isolated territory. During the depression, First Nations people didn't know such a thing was even going on because of our resources. Salmon is also down. I hope we can get together and really look into what is causing them to leave our territory. Find out the cause. We are deeply concerned about this. So many people travel from Kitamaat today but many more are concerned. It is a staple for our people. I proposed at the last meeting in Bella Coola that we host something in Kitamaat for all concerned but there was no funding.

Cecil Paul

I have journeyed to come and attend something for which I feel strongly: the eulachon that my people have harvested for untold centuries. I look around and see that half of you are non-native. I ask… what love do you have for this fish? I was born on the banks of the Kitlope River. In 1938, a boat came up with a little motor and I was taken to residential school. We amalgamated with the Haisla people more than 50 years ago. I have witnessed the death of the rivers to eulachon. It is very sacred among my people. Who will give me the answer? This man (Doug Hay), the work he has done has given me an answer to what my granny asked so many years ago. Eulachon was our currency. We traded for herring, halibut, seaweed. Now the people who used to trade feel the hunger pains for this fish. Walk softly, communicate with each other with respect and we will find an answer for something that disappeared. A week after the Skeena, then goes the

Nass, a few days later, Kitimat and so on south. Toothless fish returned to the ocean after they spawn? How far did you journey? My place in the Gardner Canal where there are three rivers. Somebody asked today… is it the smell of the river? From DFO, we know it is so with the salmon. But for eulachon they have only begun to study. For a long time, I've had my finger on the trawlers. No longer, my number one concern now is the environment: global warming. I have never used butter on my toast and now limit myself to once a month eulachon grease on my toast. I'm hungry, our people are hungry. Let's journey together and find an answer.

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Mrs Louisa Smith

My family has talked about the decline of the eulachon in our area. It has been mentioned that if they don't return this year it will have been six years without. Last year, there was a trickle of eulachon. The fishermen in camp had one feed of eulachon. We feel devastation when we leave camp with nothing. With Kitimat River, we know the reason the eulachons still trickle, but it's not edible. Eulachon smell of sulphur so it's obvious what the river has done to the fish. In the Kildala River maybe the spray of chemicals to kill the brush around power lines has affected eulachon. Kemano, in earlier times it was not fished. The hardness of the sand bed was too much for the eulachon to spawn. In Kemano, (BC) Hydro agreed about controlling the water flow in the month of March. We also question the river chemistry of the hydroelectric plant. When we talk of the water flow, my brother Cecil, when we fished in the Kitlope, the eulachon in the river would go down backwards because the river was too high. Therefore, we think river flow has high impact on eulachons going up the river. In Matheuse Bay, occasionally if they didn't come back to Kitlope, then we would go to Matheuse Bay. There we harvested eulachon for smoking purposes. Kitlope River was a traditional eulachon camp for many years. We often wonder and fear that the helicopter that went down in the lake contributed to pollution. Several years before our people made an effort to take the helicopter out of the lake. My brothers and I were talking and we have our own scientist that we never question– our creator. Talk of rains coming and river rises and eulachon backing up; we have no quarrel with this. But there is quarrel when the disturbance is manmade. Combine technology, science and traditional knowledge to come together before extinction occurs. Friends from the Nass shared feeds for the last five years. Indicative of how much we share with each other. A currency. Based on data presented, we are thankful for the information. We didn't know where they went and their migration. We only knew the arrival time and our preparation for when they would arrive. With more data available, we may be able to come together to understand what has happened. I want to emphasize that the eulachons are a huge commodity for the First Nations peoples. When we harvest the oil, you could say that it is indeed liquid gold. It has a golden colour and it is so highly prized that it is our gold. I hope that with this gathering, people will understand that this is not a lowly fish. It is high quality oil that we extract with many uses, including medicinal purposes. When missionaries came up in earlier times, they found out the medicinal properties of the grease and compared it to cod liver oil they used to ward off colds and viruses. It is my hope that DFO and scientists tell the government that this is a prized commodity for the First Nations peoples. I echo

my brother that we are hungry without that fish. Other areas call it the saviour fish because it comes when other food items have been depleted.

Highlights

During presentations and group discussions, a number of issues were raised repeatedly and are highlighted here.

1. Lack of recognition of the cultural importance of eulachon to coastal First Nations
2. Inadequate funding for monitoring and research
3. Need for links between scientific and traditional knowledge
4. Coordination of "eulachon nations"
5. Standardization of research methods between river systems

RESEARCH NEEDS

Research needs identified by the group

- Analyse the relationship between water temperature and timing of run: temperature loggers were used in Bella Coola research but the analysis has not been done.
- Migration routes for each stock system – where do they go when they leave the river?
- Track the timing of runs within the river at a fine scale spatial resolution
- Resolve the effective stock unit structure by obtaining and analyzing samples from all eulachon rivers. A sample is one gram of fish from 50 fish from each river, for each year.
- Extend the scientific time series using traditional knowledge and other sources
- Improve observer coverage in fisheries with eulachon bycatch

Doug Hay also identified a list of research needs and his top 13 research recommendations are:

1. Reconstruct North Coast offshore eulachon abundance estimates.
2. Investigate coherence between shrimp and eulachon – why do shrimp and eulachon seem to follow the same abundance trends offshore? Is there a common factor affecting both species?
3. Traditional ecological knowledge (TEK) documentation and accessible reports – need for a definitive report on TEK about eulachon in an accessible format
4. Review of the DFO eulachon bycatch policy: assumptions, effectiveness and legality
5. Shrimp trawl gear research (1) – efficacy of Bycatch Reduction Devices. Do BRD's reduce absolute mortality of eulachon or simply reduce the number brought on deck?
6. Shrimp trawl gear research (2) – vulnerability of eulachon to capture using different gear configurations
7. Stock identification research using otolith microchemistry
8. Spawning behaviour research: radio or acoustic tagging to determine distribution inshore marine waters and in-river during spawning runs
9. Spawning area documentation – small streams and rivers

10. Increased coverage of egg and larval sampling across rivers. Especially, northern rivers
11. Salinity and other environmental tolerances
12. Expand the current sampling and monitoring programs, both DFO and FN
13. An international symposium with delegates from Alaska, BC, Washington, Oregon and California

ACKNOWLEDGMENTS

The organizers would like to thank all the presenters and participants for their valuable input and contributions. Though detailed notes of presentations and discussions were taken during the workshop, any errors of omission, oversight, or misunderstanding are our own. We wish to thank Norman Dale for his assistance during the meeting and Doug Hay and Megan Moody for comments on earlier drafts.

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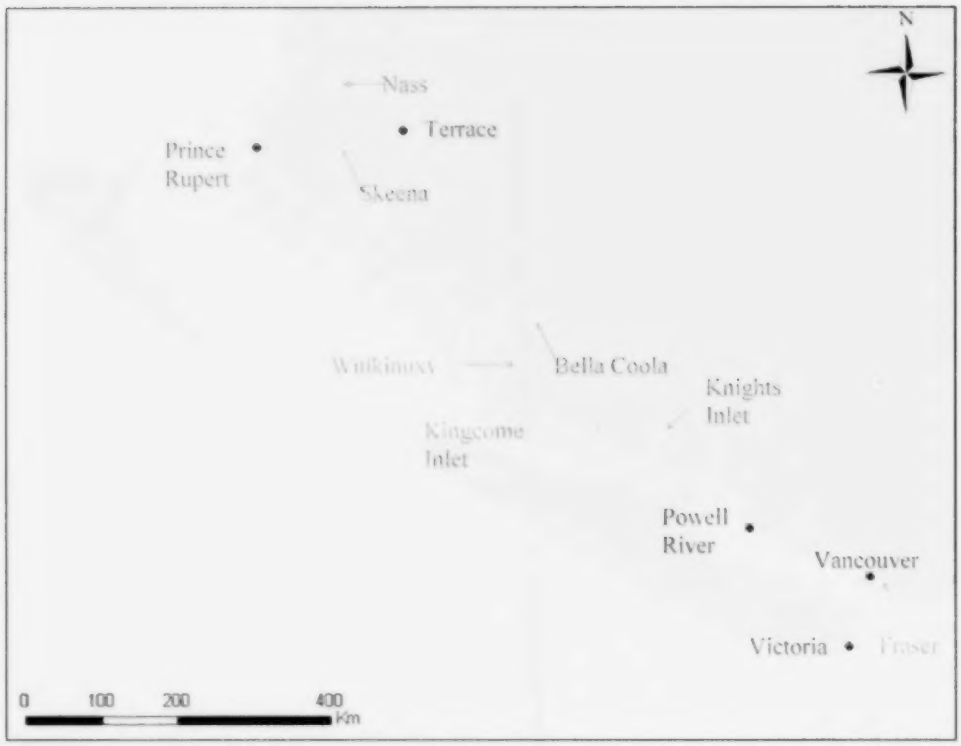

Figure 1: Map of some of the major eulachon spawning rivers discussed in the text, cities are in green and rivers in grey with arrows.

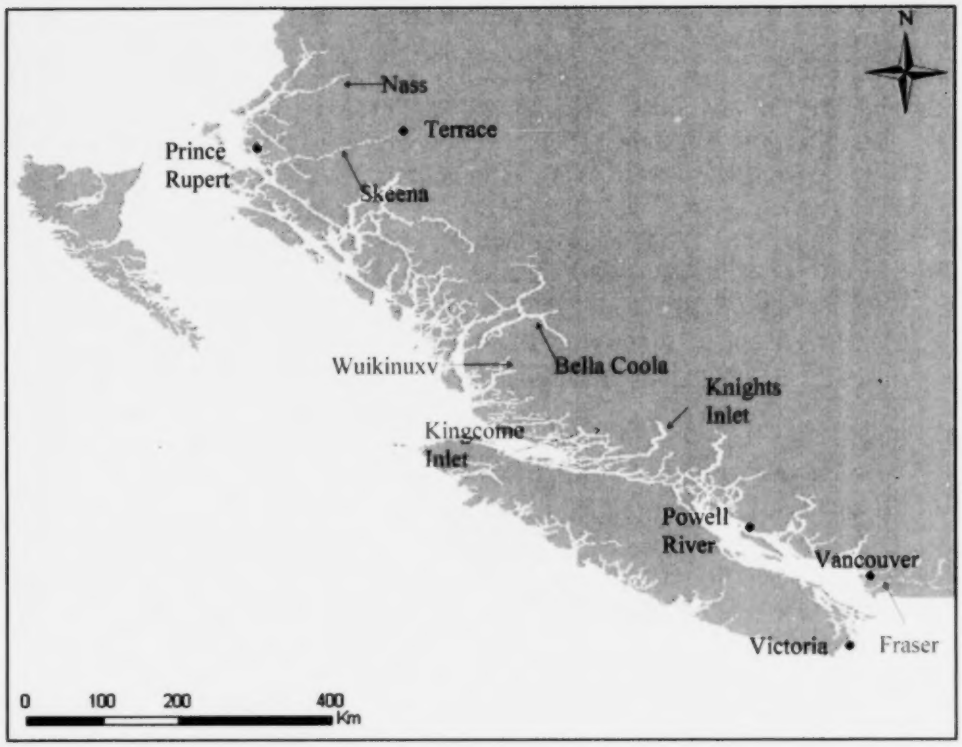

Figure 1: Map of some of the major eulachon spawning rivers discussed in the text, cities are in green and rivers in grey with arrows.

APPENDIX I: LIST OF ATTENDEES

Name	Organization
Alvin Azak	Nisga'a Village
Andy Lewis	DFO
Barb Faggetter	Ocean Ecology
Bart Proctor	Oona River Resources Association
Bill Mounce	
Blair Stewart	Nisga'ahisims Government
Cathryn Clarke Murray	UBC
Cecil Paul	Kitamaat Village
Charles Menzies	Gitxaata/UBC
Chris Wilson	Haisla Marine Use
Clyde Smith	
Craig Johnson	Wuikinuxv Nation
Cristina Soto	
Dan Paul	Kitamaat Village
Dave Gordon	CambriaGordon Ltd
Dave Rolston	
David Cook	
David Latremouille	Haisla Fisheries
Diana Freethy	DFO
Don Roberts	
Doug Hay	Retired DFO
Fred McKenzie	Kitselas First Nation
Gerald Amos	Head Waters Initiative
Henry Clifton	Hartley Bay NBBC
Jackie Porteous	
James Casey	WWF - Canada
James Witzke	Contract Biologist
Jennifer Fowler	Eurocan Pulp and Paper
Jennifer Rice	
Jim Hansen	DFO
Ken Hall	Kitamaat Village
Ken McDames Jr	Kitselas First Nation
Kennard D Hall	Ocean Ecology
Larry Golden	
Louisa Smith	Kemano/Prince Rupert
Luanne Roth	
Mark Potyrala	DFO
Michelle Mintenko	Metlakatla Fisheries
Mike Jacobs	Haisla Fisheries
Mitch Drewes	DFO
Norman Dale	Rapport
Pauline Ridings	DFO
Peter Freeman	Northwest Community College
Ray Green	Haisla
Robert Hughes	Laxkw'alaams
Sandra Davies	DFO
Ted Gamble	Kitkatla
Tom Therriault	DFO
Trevor Gray	DFO
Victor Ewert	Redfish Services
Wally Webber	Nuxalk Nation
Wayne Jacob	Wuikinuxv Nation
William Beynon	Metlakatla Fisheries

APPENDIX II: WORKSHOP AGENDA

North Coast Eulachon Workshop

Hosted by Fisheries & Oceans Canada

March 4-5, 2009
Crest Hotel
222 West 1st Ave
Prince Rupert, British Columbia, Canada

Day 1 – March 4, 2009

9:00 am	Welcome and Introductions
10:00 am	Group forum "Status of eulachon in the north coast" * Brief presentations and discussion of northern eulachon runs
11:00 am	Doug Hay, former scientist Fisheries & Oceans Canada "A biological overview of eulachon"
12:15 – 1:30 pm	**Lunch**
1:30 pm	Discussion of morning session
2:00 pm	Don Roberts, Kitsumkalum First Nation "Merging traditional and scientific knowledge"
3:00 pm	Directed Discussion Status of research projects and potential collaboration
3:30 pm	Summary discussion and wrap up
4:00pm	**Close**

* Attendees are invited to speak briefly about the status of eulachon runs in the rivers with which they are most familiar. Specifically, have returns been higher, lower or relatively unchanged in recent years?

Day 2 – March 5, 2009

9:00 am	Megan Moody, Nuxalk "A First Nations perspective on eulachon"
10:00 am	Norman Dale, Independent "An eulachon retrospective and leadership needs"
11:00 am	Doug Hay, Fisheries & Oceans Canada "Eulachon and COSEWIC - the consequences of a possible SARA listing"
12:15 pm – 1:30pm	**Lunch**
1:30 pm	Plenary Discussion: "Action and Research Needs for Eulachon Conservation" Topic #1 – What information is available to aid in COSEWIC listing and what is still required? What are the consequences of eulachon listing under the Species at Risk Act? Topic #2 – What are the priorities for future management? Monitoring projects, research needs, eulachon database, and potential management and conservation strategies.
3:30 pm	Wrap up discussion
4:00 pm	**Close**